

Agenda

Wednesday, April 28th Room A-2022;

1:00 PM PDT	Introductions
1:20 PM PDT Evenson	Refresher on the Basics of the Water Census Initiative – Eric
2:00 PM PDT	Presentation of Water Indicators Concept Paper – Eric Evenson
2:20 PM PDT	Discussion of Water Indicators
3:00 PM PDT	Break
3:20 PM PDT	Presentation of Ecological Flows Concept Paper – Eric Evenson
3:40 PM PDT	Discussion of Ecological Flows Concept Paper
4:40 PM PDT	Wrap up of Day
5:00 PM PDT	Adjourn for Day

Agenda

Thursday, April 29th Room A-2022;

- | | |
|--------------|---|
| 8:00 AM PDT | Presentation of Water Use Concept Paper – Eric Evenson |
| 8:20 AM PDT | Discussion of Water Use |
| 9:20 AM PDT | Break |
| 9:40 AM PDT | Presentation of Products, Decision Support Systems, and
Information Management Concept Paper – Eric
Evenson |
| 10:00 AM PDT | Discussion of Products, Decision Support Systems, and
Information Management |
| 11:00 AM PDT | Discussion on Organizing the Remainder of the Review |
| 12:00 PM PDT | Adjourn Meeting |

Primary Considerations:

What are the products you want to see USGS produce?

How would you like to see these products presented?



A National Water Census

* Part of the  Initiative

Water Census: Accounts for the changing amount, quality, and use of water resources across the Nation.

Primary Water Census questions:

Does the Nation have an adequate availability of freshwater to meet both human and ecological needs?

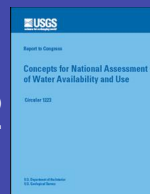
Will this water be present to meet both existing and future needs?

Our objective for the Water Census:

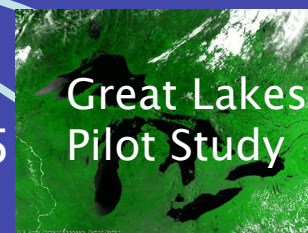
To place technical information and tools in the hands of stakeholders, allowing them to answer water availability questions.

How did we get to where we are today?

2002



2005



2011

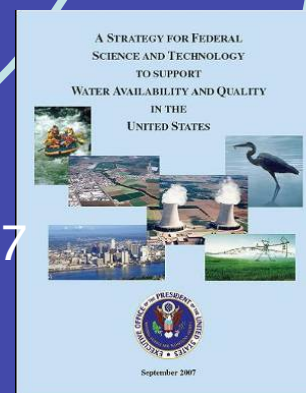


Water Availability and Use Assessment

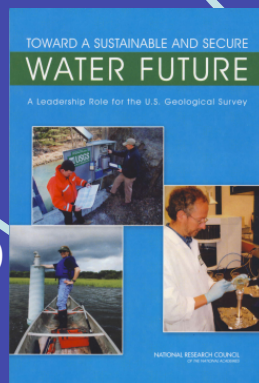
2007



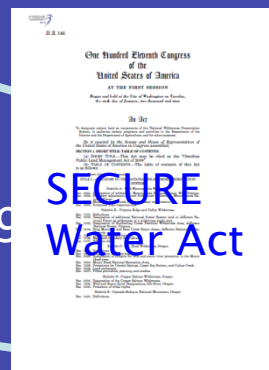
2007



2009



2009



How do the National Water Census and WaterSMART Interrelate?



Is a Department of Interior Initiative on water conservation. It includes activities in:

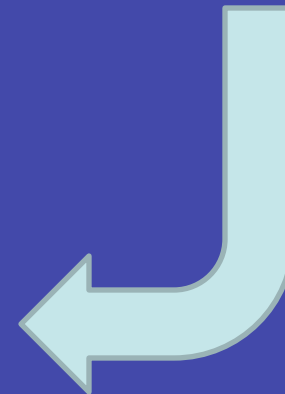
- Bureau of Reclamation
- US Geological Survey
- Office of the Ass't. Sec. for Water and Sci.



The Water Availability and Use Assessment proposed in the 2011 budget is part of WaterSMART and the National Water Census

The Nation Water Census

is an integral part of the US Geological Survey's Science Strategy to conduct an ongoing assessment of the Nation's water resources



**P.L. 111-11 Subtitle F
(SECURE Water Act as signed by the President March 30, 2009)**

Section 9501: Findings

Section 9502: Definitions

Section 9503: Reclamation Climate Change and Water Program

Section 9504: Water Management Improvement

Section 9505: Hydroelectric Power Assessment

Section 9506: Climate Change and Water Intergovernmental Panel

**Section 9507: Water Data Enhancement by
United States Geological Survey**

Full National Streamflow Information Program.

*Creates a National Groundwater Resources Monitoring Program
and a Brackish Groundwater Assessment.*

Section 9508: Water Availability Assessments

Creates a national program to study water quality and quantity.

Requires first report in 2012 and every 5 years thereafter.

*Grants are available to assist state agencies in developing and
integrating state water use data.*

Section 9509: Research Agreement Authority

Section 9510: Effect

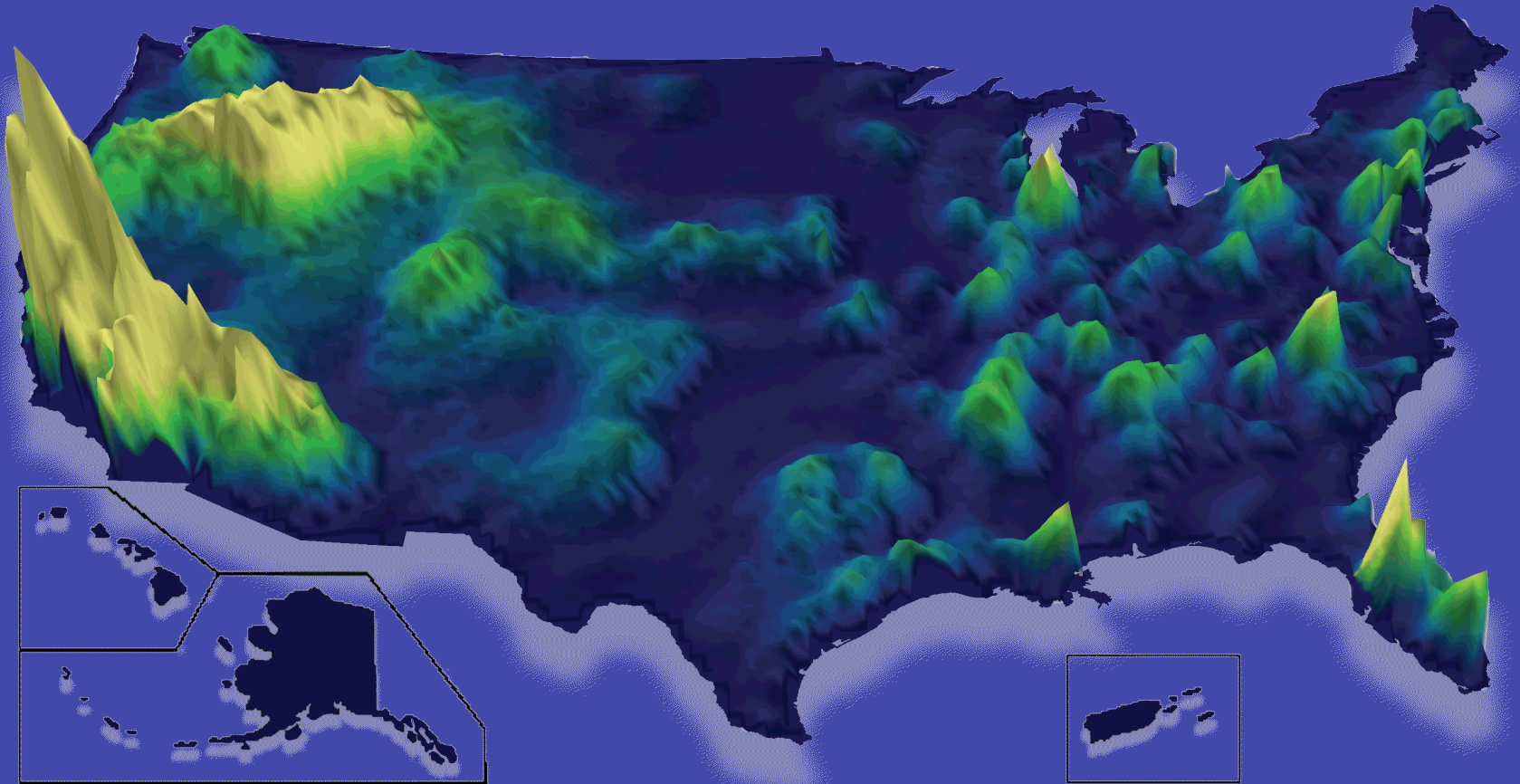
Section 9508 of SECURE Water calls for a National Water Availability and Use Assessment Program

1. Assessment of the status of the water resources of the United States;
2. Quantity of water that is available for beneficial uses;
3. Quality of the water resources of the United States;
4. Long-term trends in water availability;
5. For each long-term trend – a more accurate assessment of the change in the availability of water
6. Develop the basis for an improved ability to forecast the availability.

Report to Congress – Every 5 years thereafter:

1. The **current availability** of water resources in the United States,
2. **Significant trends** affecting water **availability**, including documented or projected impacts as a result of global climate change,
3. The **withdrawal and use** of surface water and groundwater by various sectors,
4. **Significant trends** relating to each **water use** sector, including significant changes in water use due to the development of new energy supplies,
5. **Significant water use conflicts or shortages** that have occurred or are occurring,
6. Each **factor** that has **caused**, or is causing, a conflict or shortage.

New Authority: Water Use Grants to States

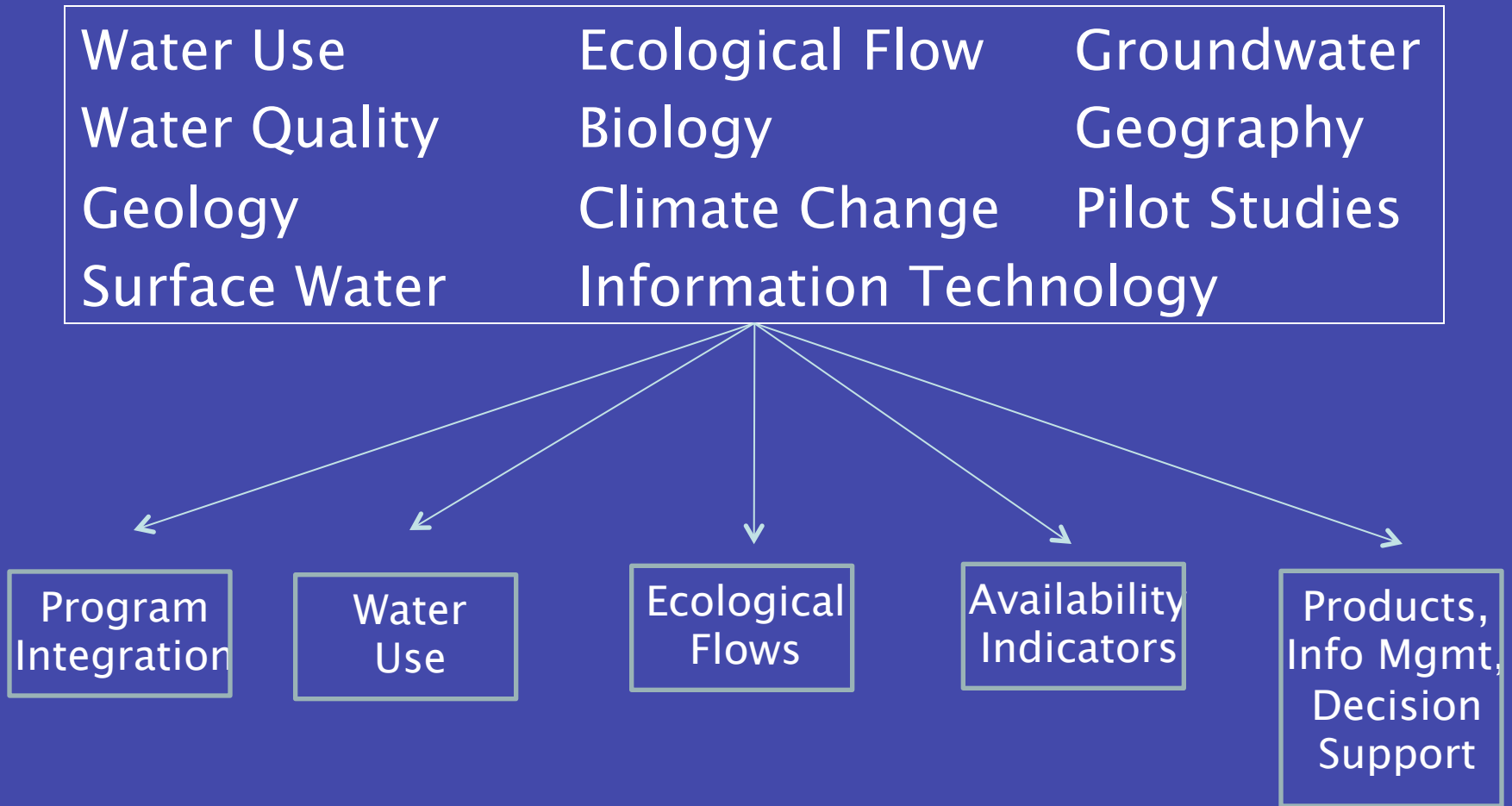


What is USGS doing on SECURE Water today?

- *Subcommittee on Groundwater*
- *Streamgaging*
- *Brackish Groundwater Assessment*
- *Water Use*

Next Steps?

USGS Implementation Team



- Implementation Team produces short “concept papers”
- Team works through ACWI / SWRR ad hoc Committee to refine the concepts to meet stakeholders goals
- Team develops a draft implementation plan from the work with the ACWI / SWRR committee
- USGS finalizes and publishes a plan for the National Water Census

Stakeholders on ad hoc committee

Organization	Acronym
Association of Fish and Wildlife Agencies	AFWA
Association of Metropolitan Water Agencies	AMWA
Association of State Drinking Water Administrators	ASDWA
American Water Resources Association	AWRA
American Water Works Association	AWWA
Interstate Council on Water Policy	ICWP
National Ground Water Association	NGWA
The Nature Conservancy	TNC
Western States Water Council	WSWC
Bureau of Reclamation	BOR
US Fish and Wildlife Service	USFWS
US Dept. of Energy – Energy Information Administration	DOE – EIA
NOAA National Weather Service	NOAA–NWS
US Army Corps of Engineers	USACE
US Dept. of Agriculture – Economic Research Service	USDA – ERS
US Dept. of Agriculture – NASS	USDA – NASS
US Dept. of Agriculture – NRCS	USDA – NRCS
US Dept. of Agriculture – Forest Service	USDA – USFS
US Environmental Protection Agency	EPA

Charge to the ad hoc committee

The ad hoc committee will work with the Implementation Team to improve the concepts, efforts, and products proposed for inclusion in the Water Census so that they best meet stakeholders needs.

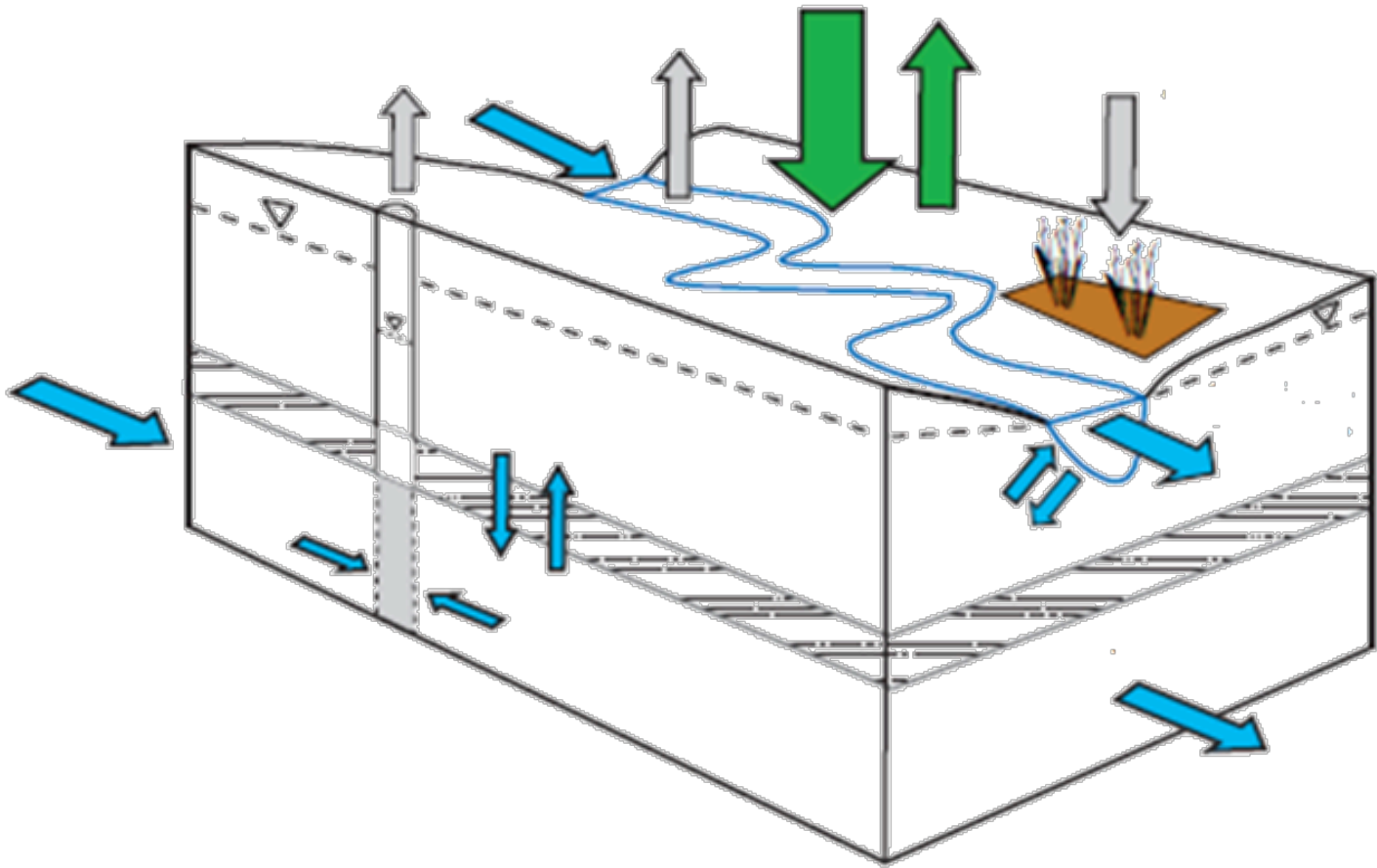
The output from the committee will be brief report to the Associate Director for Water, USGS, on the consensus reached for the Water Census.

The timeframe for this effort is February – June, 2010.

Integration of programs around the Theme of Water Availability



Account for water with a “budget”



How will we apply the 2011 funds?

Hydrologic Networks and Analysis
\$6.4 M

Groundwater Resources Program
\$1.1 M

Biological Research and Monitoring \$0.5 M

Geographical Analysis and Monitoring
\$0.5 M

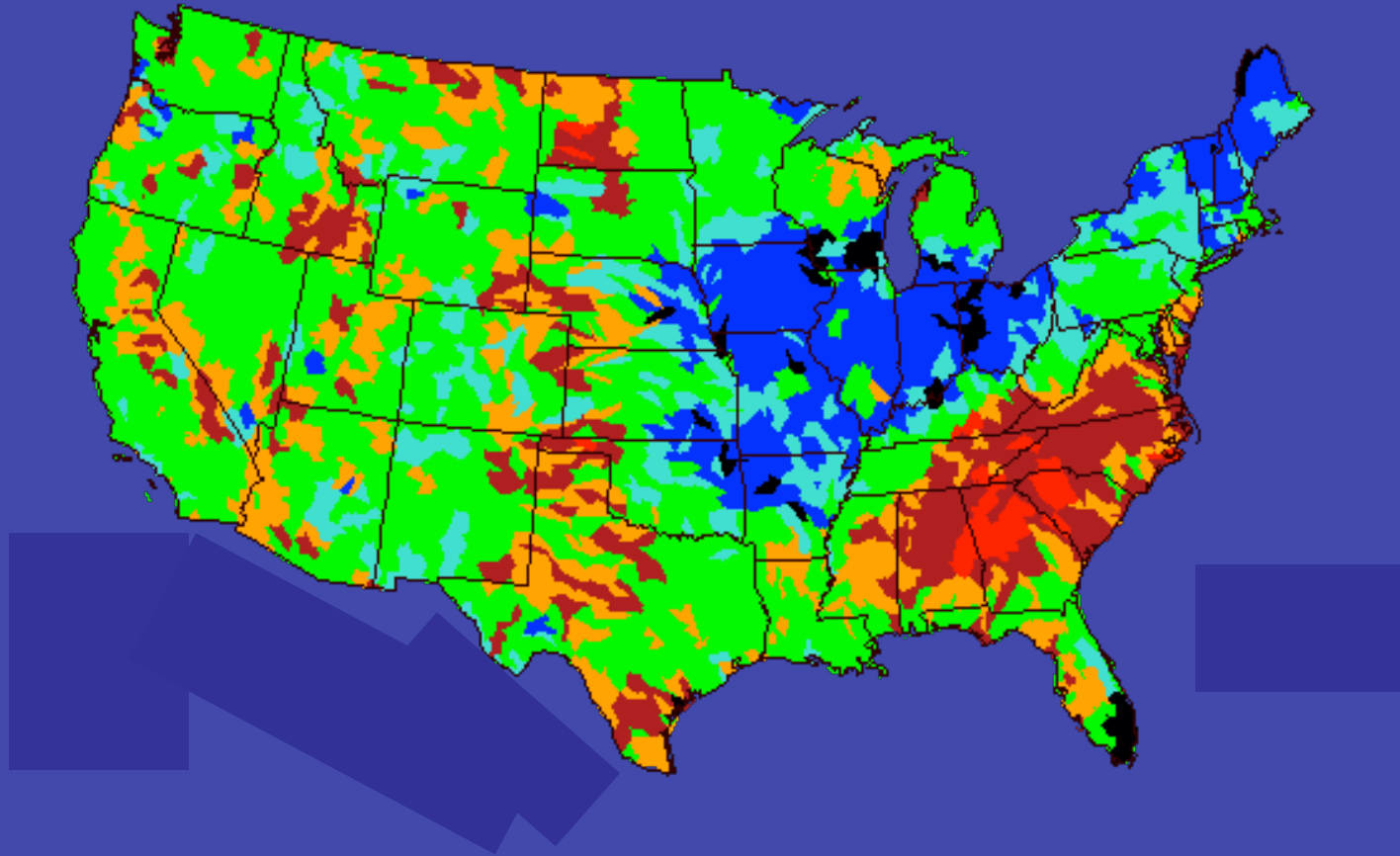
National Cooperative Geologic Mapping \$0.5
M

Total \$9.0 M

A Nationwide System to deliver water accounting information addressing

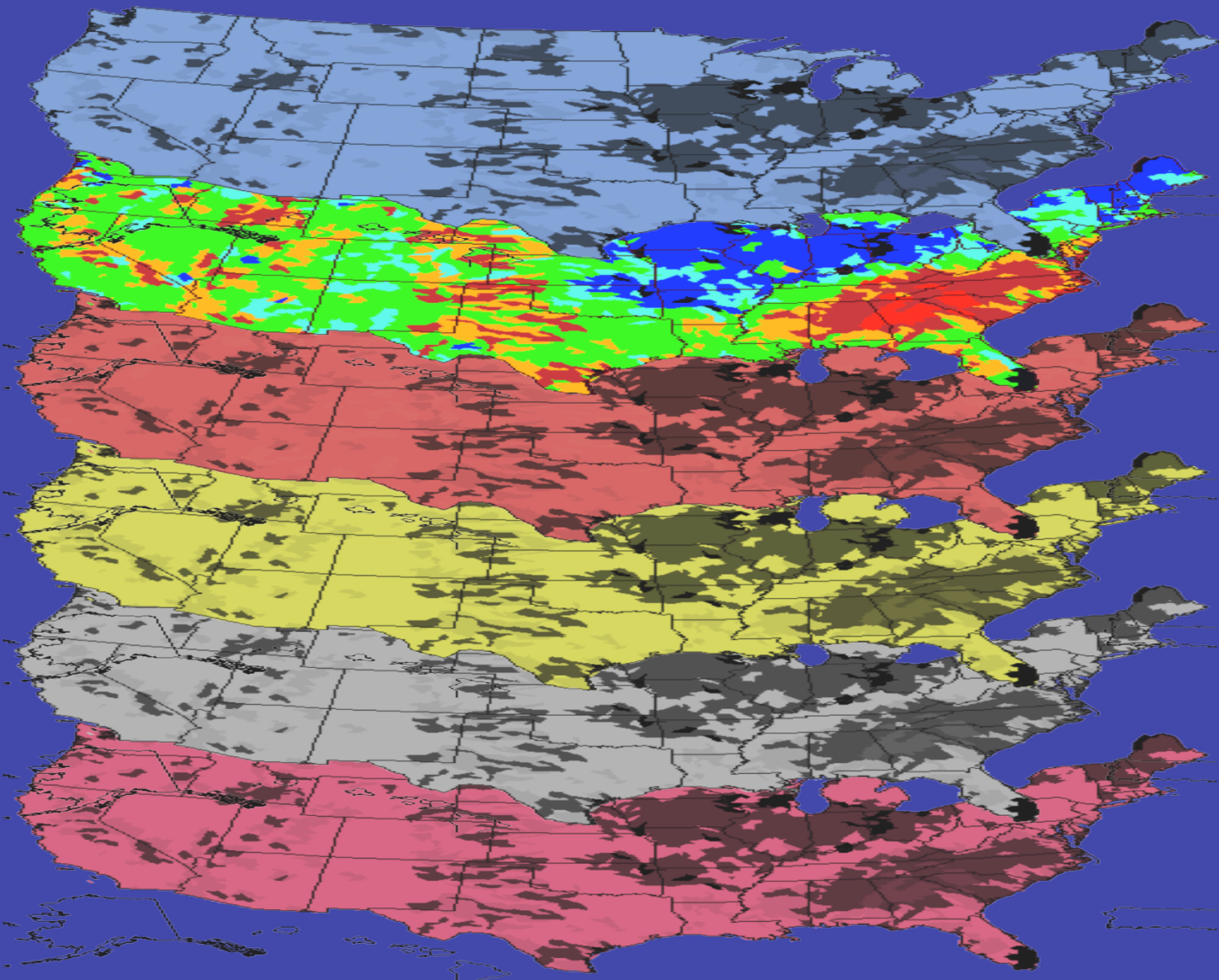
- Precipitation
- Evapotranspiration
- Storage in Reservoirs, Lakes, Snow and Ice
- Surface Water
- Groundwater
 - Recharge rates
 - Water level in aquifers
- Ecological Needs
- Water Withdrawals
- Return Flows
- Consumptive Uses
- Run-of-the-River Uses

Generating and delivering information for water accounti



Envision a seamless coverage of information for
a water accounting component

And if you could get that info for all accounting componen



Precipitation

Runoff

Baseflow

ET

Recharge

Surface Storage

How will we apply the 2011 funds?

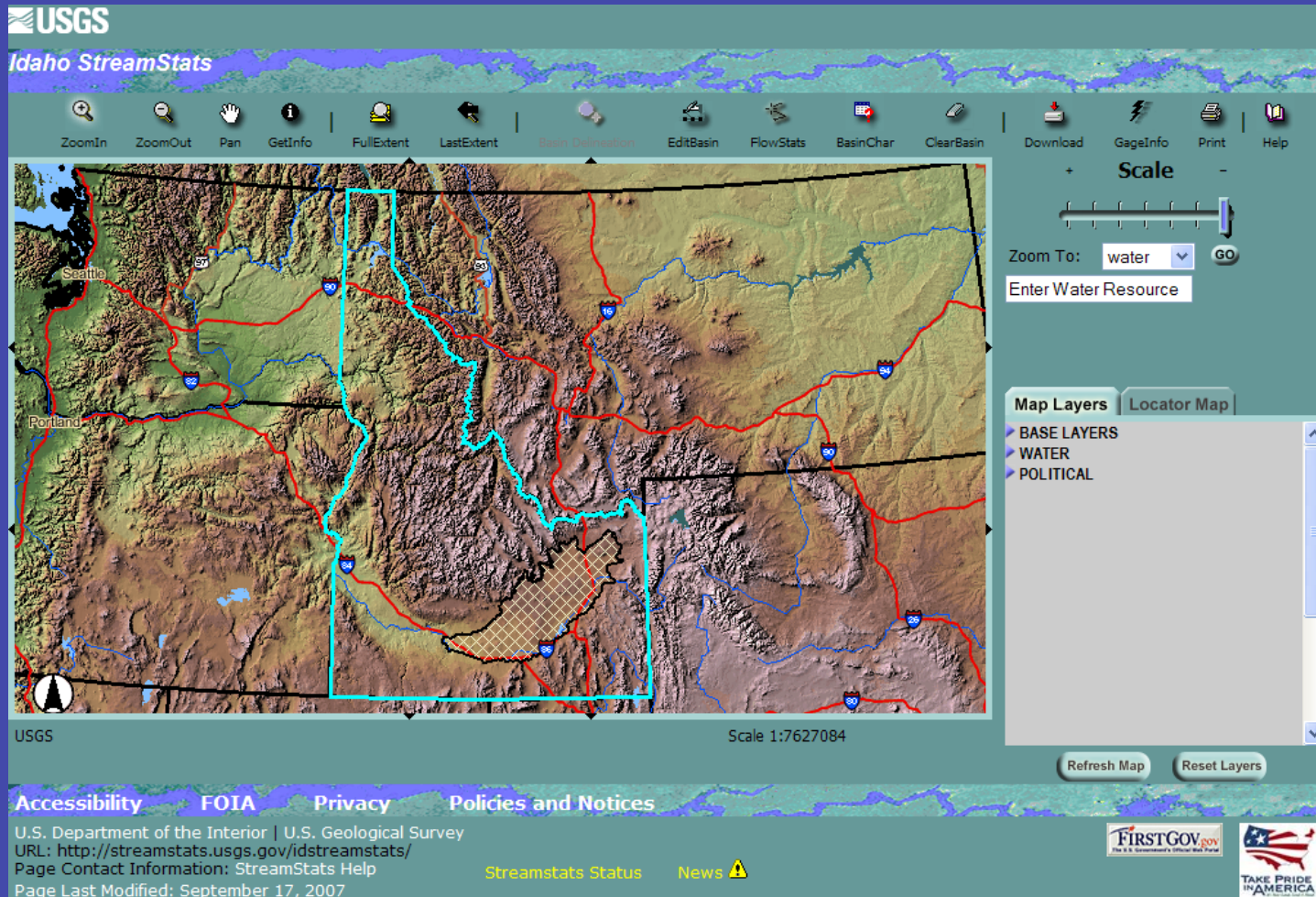
Indicators:

Hydrologic Networks and Analysis
\$0.95 M

Total	\$0.95 M
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Information Delivery

A web application for delivering water availability information at scales that are relevant to the user



Select the area of interest.

Generate information on water accounting components

Work with the online tool to construct your water budget

Access trend information

How will we apply the 2011 funds?

Information Delivery and Databases:

Hydrologic Networks and Analysis
\$0.5 M

Total

\$0.5 M

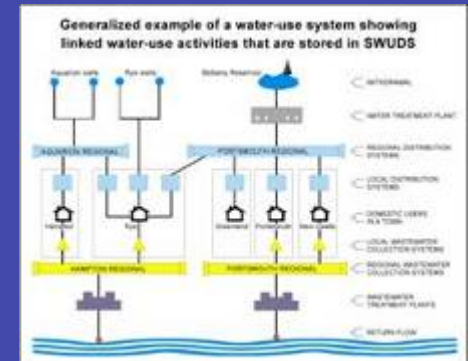
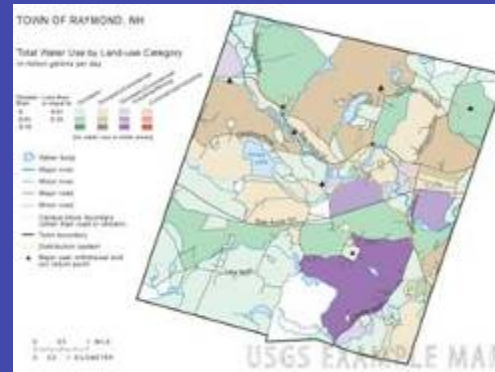
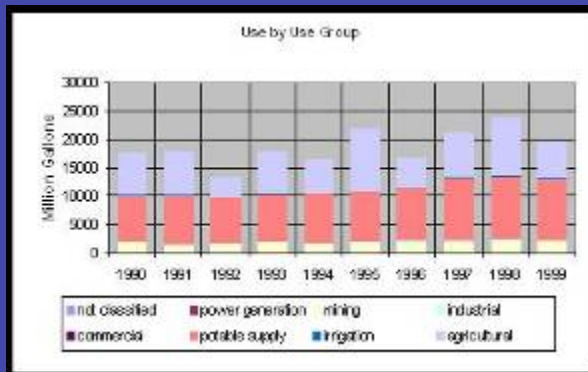
Enhancing the Nation's Water Use Information

Use New Methods to Estimate Water Use

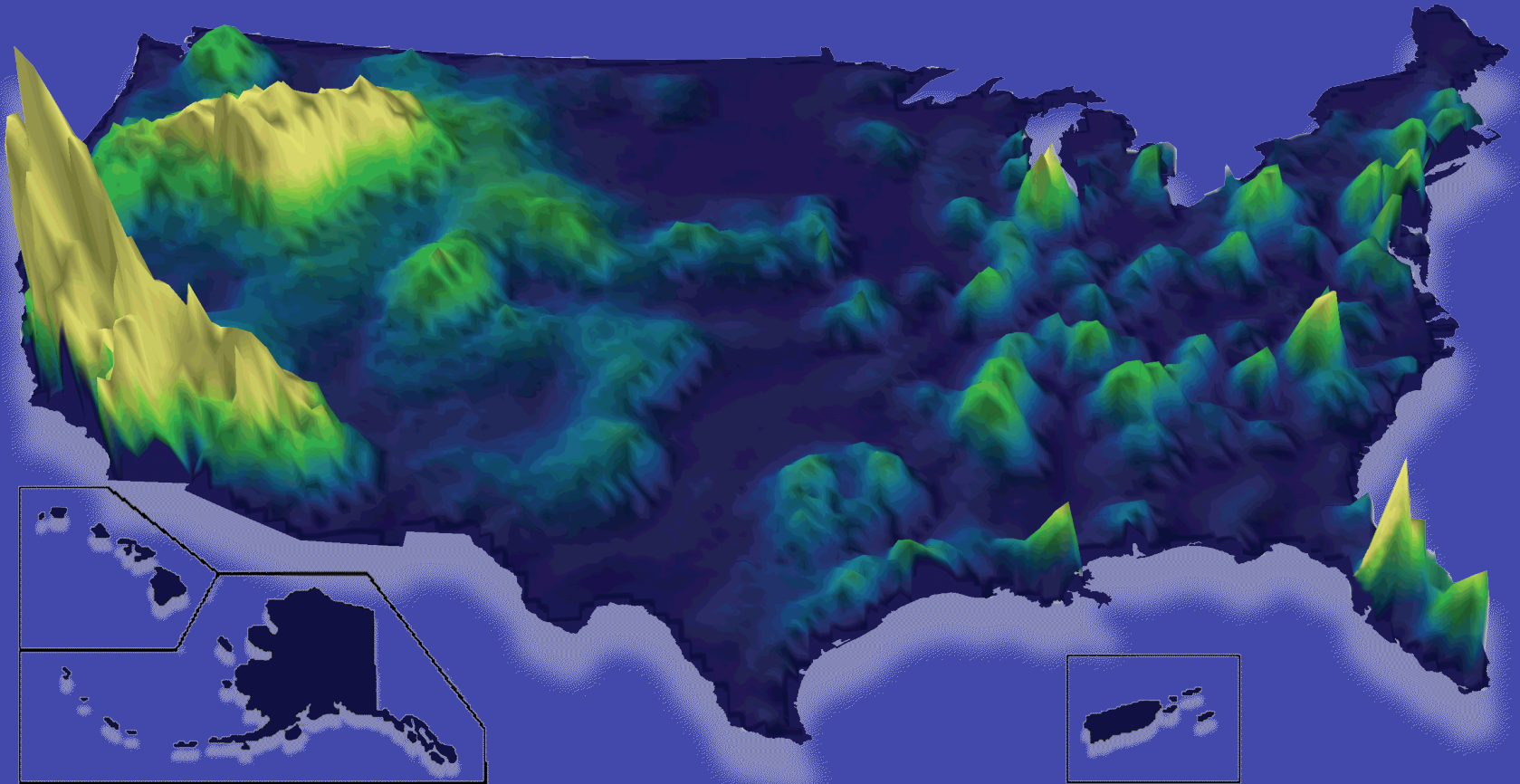
- Stratified Random Sampling
- Regression Models

Develop models of water use based on land use

Ability to track water from point of withdrawal thru to return of flow.



New Authority: Water Use Grants to States



How will we apply the 2011 funds?

Water Use Indicators:

Hydrologic Networks and Analysis

\$1.3 M

Geographical Analysis and Monitoring

\$0.5 M

Water Use Grants to States:

Hydrologic Networks and Analysis

\$1.0 M

Flows Needs for Wildlife and Habitat

- Classify the streams across the nation for their hydro-ecological type
- Systematically examine the ecological affects of hydrologic alteration
- Develop flow alteration – ecological response relationships by “h-e” type



How will we apply the 2011 funds?

Ecological Flows:

Hydrologic Networks and Analysis

\$0.85 M

Biological Research and Monitoring \$0.5 M

Total \$1.35 M

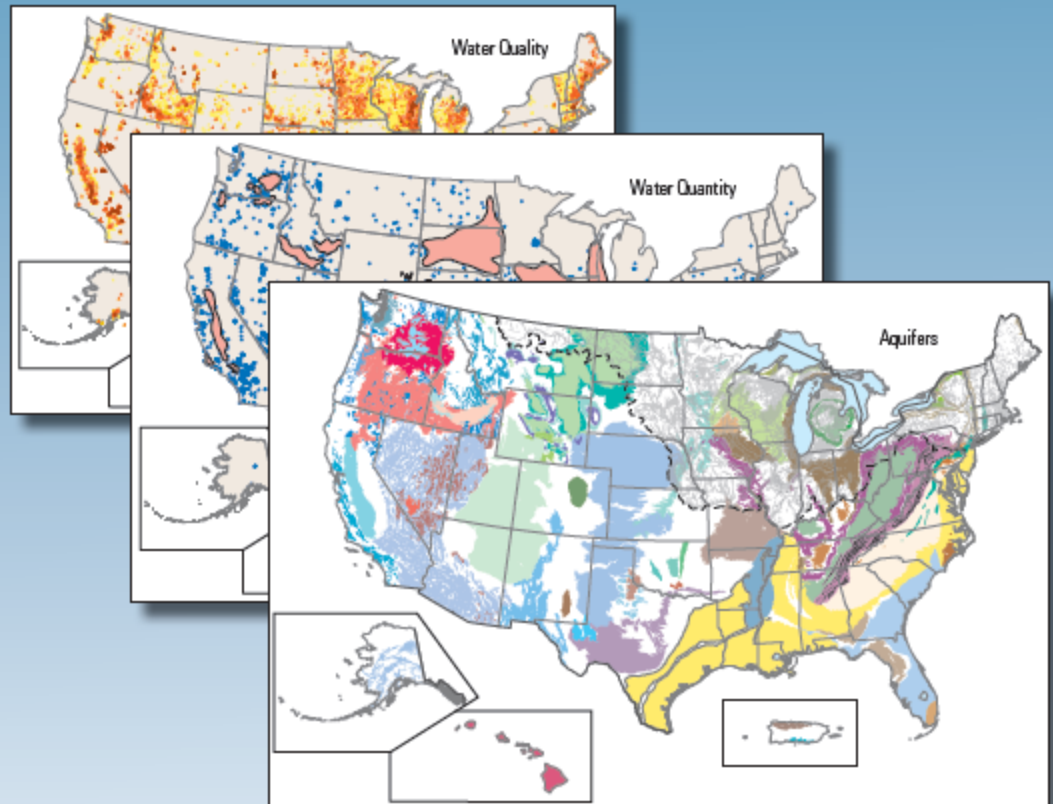
Assess Groundwater's role in Water Availability

Use the strength of and enhance the resources within this program to provide the information on:

- Recharge
- GW yields
- Changes in storage.
- Saltwater Intrusion
- Trends in GW Indices
- Artificial Recharge
- GW/SW Interactions

Ground-Water Resources Program

Ground-Water Availability in the United States



How will we apply the 2011 funds?

Groundwater Indicators:

Groundwater Resources Program

\$0.8 M

National Cooperative Geologic Mapping \$0.4
M

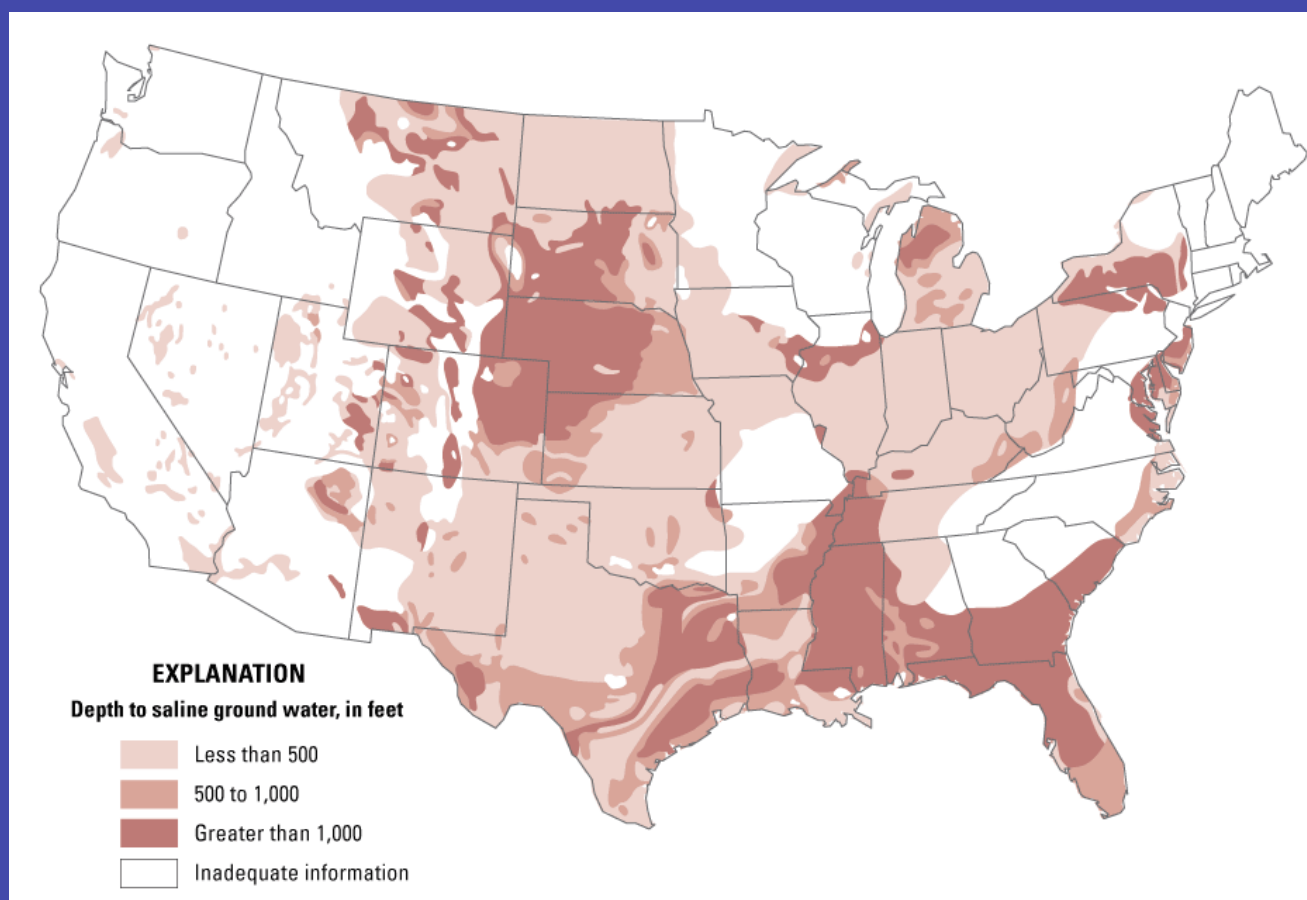
Total

\$1.2 M

Assess the Nation's Brackish Resources

Continue and strengthen the effort begun under the Challenge Projects RFP for 2010

- Locations of the res.
- Hydrologic properties
- Water quality properties
- Current uses



How will we apply the 2011 funds?

Brackish Aquifer Studies:

Groundwater Resources Program

\$0.3 M

National Cooperative Geologic Mapping \$0.1
M

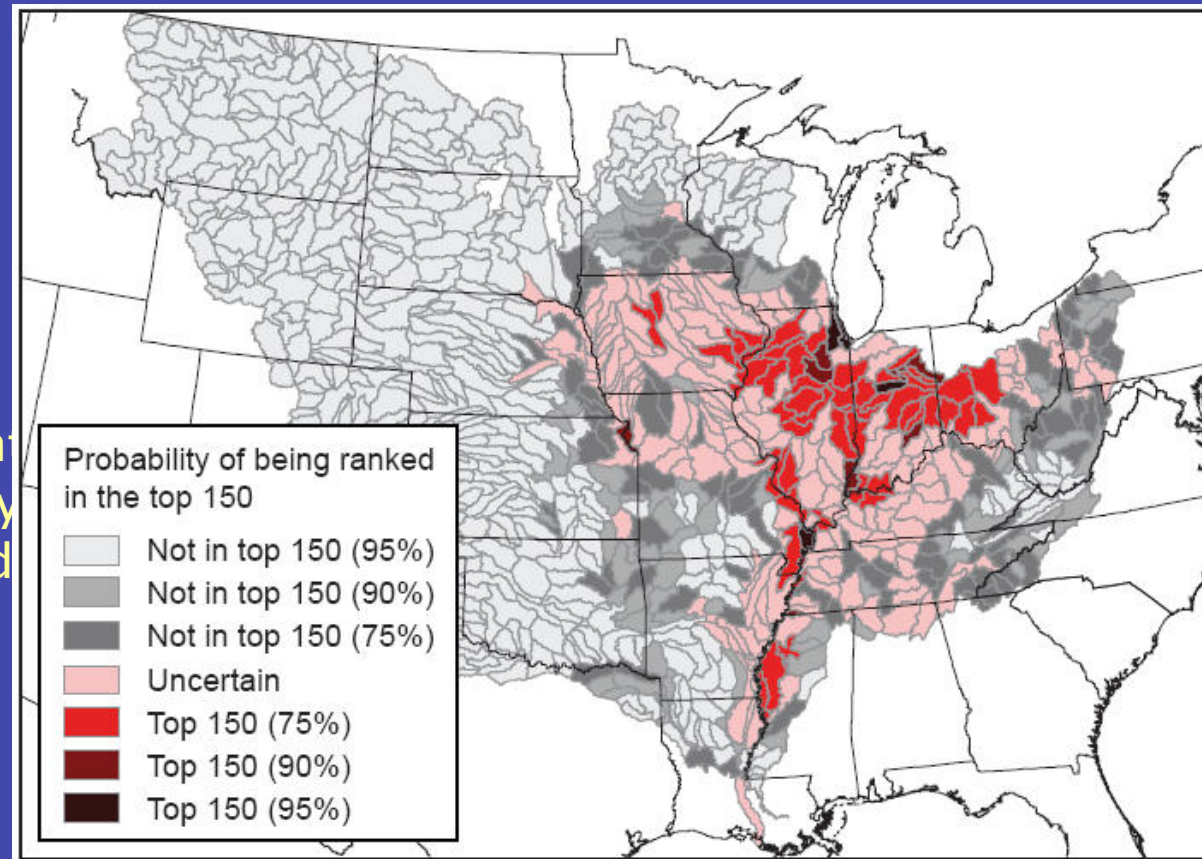
Total

\$0.4 M

Assess Water Quality's role in Water Availability

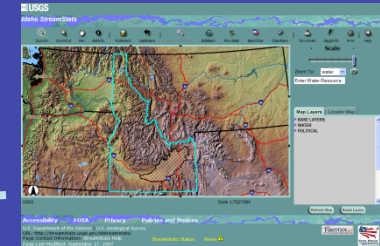
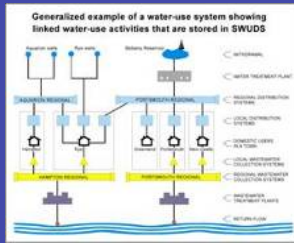
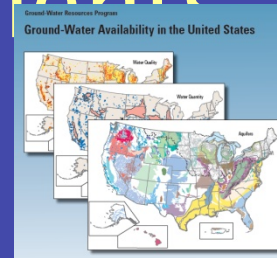
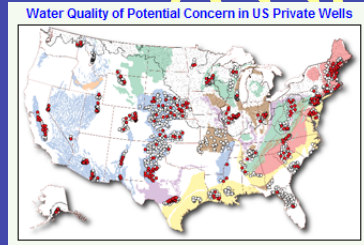
Use the strength of the NAWQA Program and tools like SPARROW to:

- Demonstrate the degree of water quality impairment that limits water availability
- Define the main compound of importance.
- Relate to water use and return
- Trends



Finally, three studies focused on selected watersheds: the Colorado River, the Delaware River, and the ACF Rivers – where there is significant competition over water resources. Here, the USGS will work collaboratively with stakeholders to comprehensively assess the technical aspects of water availability.

Focused Water Availability Assessments



Water Quality

Groundwater Resources

Water Use

SW Trends,
Precipitation, etc



Eco Flows

Global Change



State, Local, Regional
Stakeholder Involvement

Defined Technical
Questions to
be Answered

How will we apply the 2011 funds?

Focus Area Studies:

Hydrologic Networks and Analysis
\$1.5 M

Total	\$1.5 M
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How will we apply the 2011 funds?

Program Support and Grants Mgmt:

Hydrologic Networks and Analysis

\$0.3 M

Total

\$0.3 M

The objective is to place the information and tools into stakeholders hands to answer the questions they are facing.

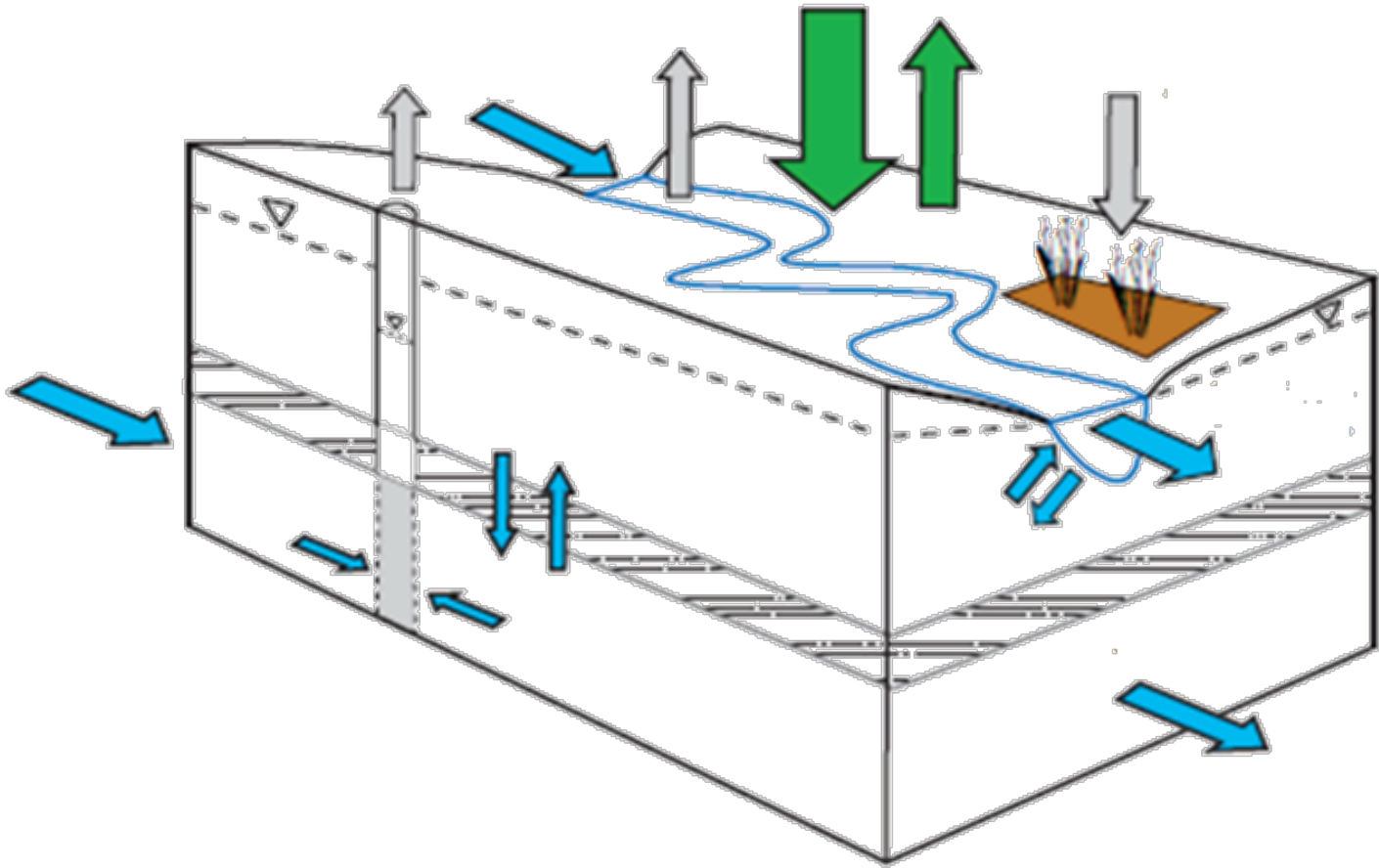


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eevenson@usgs.gov

Next 9 slides – Presentation
of Water Indicators Concept
Paper

Account for water with a “budget”



A Nationwide System to deliver water accounting information addressing

Hydroclimatic indicators	Definition	Units
Precipitation, P	P	L / t ⁽¹⁾
Potential Evapotranspiration, PET	PET	L / t
Evapotranspiration, ET	ET	L / t
Local runoff, R	$P - ET$	L / t
Runoff Ratio, RR dimensionless	$1 - ET/P$	
ET Ratio, ETR dimensionless	ET/P	
Aridity Index, AI dimensionless	PET / P	
Snowpack and timing of snowmelt, Snp Julian Day	Snp, Jul. Day	L,

A Nationwide System to deliver water accounting information addressing

Surface–water indicators

Streamflow (SWout)	Swout	L ³ / t
Total SW storage (glaciers, snowpack, surface water)	Ssw	L
Seasonal changes in storage pos. or negative value	dS/dt	L / t
Longterm change in storage pos. or negative value	dS/dt	L / t
Streamflow characteristics (ie. IHA, HIP/HAT)	varies	variable units
Streamflow timing, river ice, ice–out	varies	Julian Day
Streamflow characteristics relative to thresholds of ecological function	varies	
Proportion of resource with water quality above human–health benchmark(s)	----	dimensionless
Proportion of resource with water quality above dimensionless native biota benchmarks	----	

Major Issues for Discussion

Scales: space and time

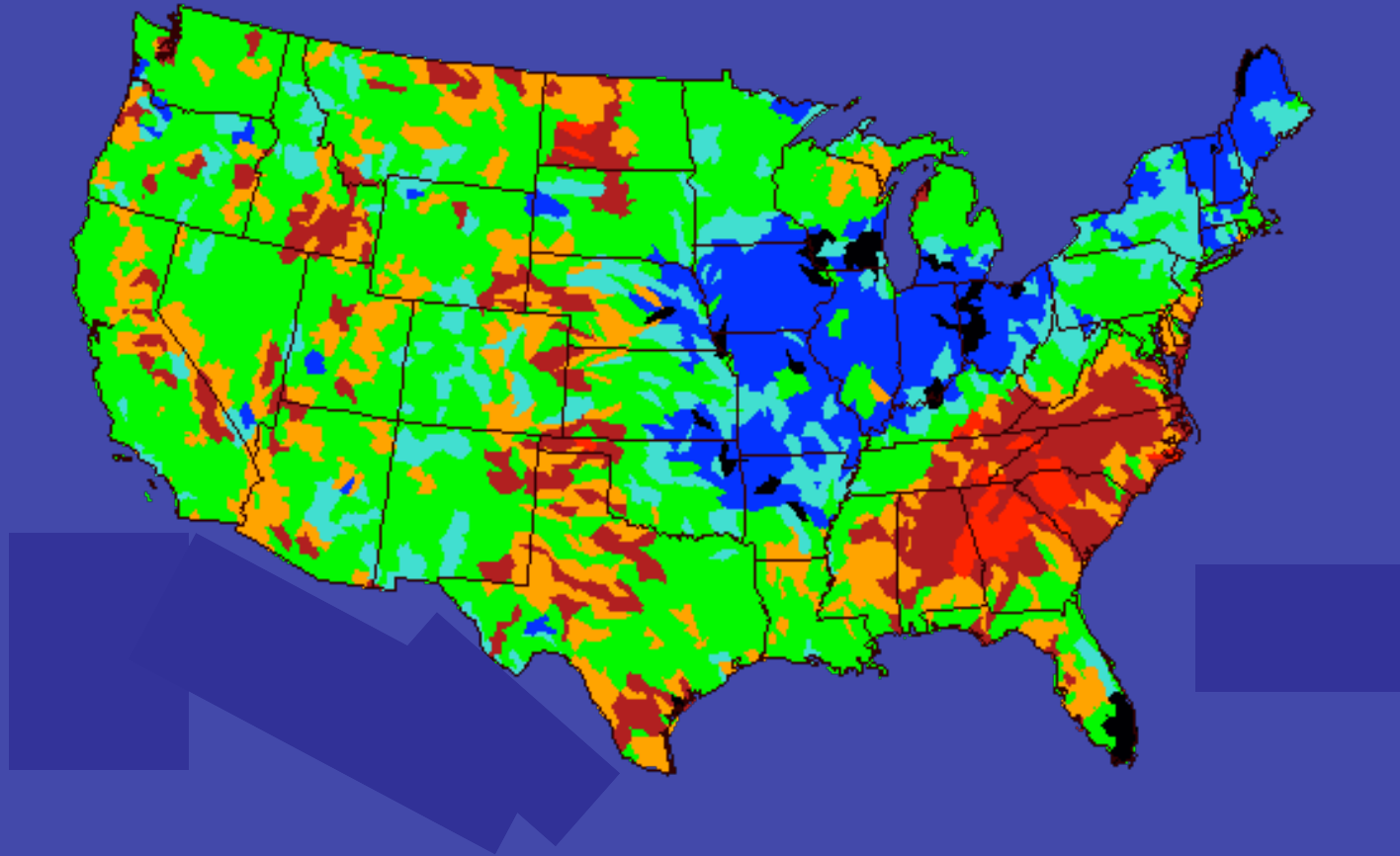
Status and Trends

Describing Uncertainty

Research Challenges:

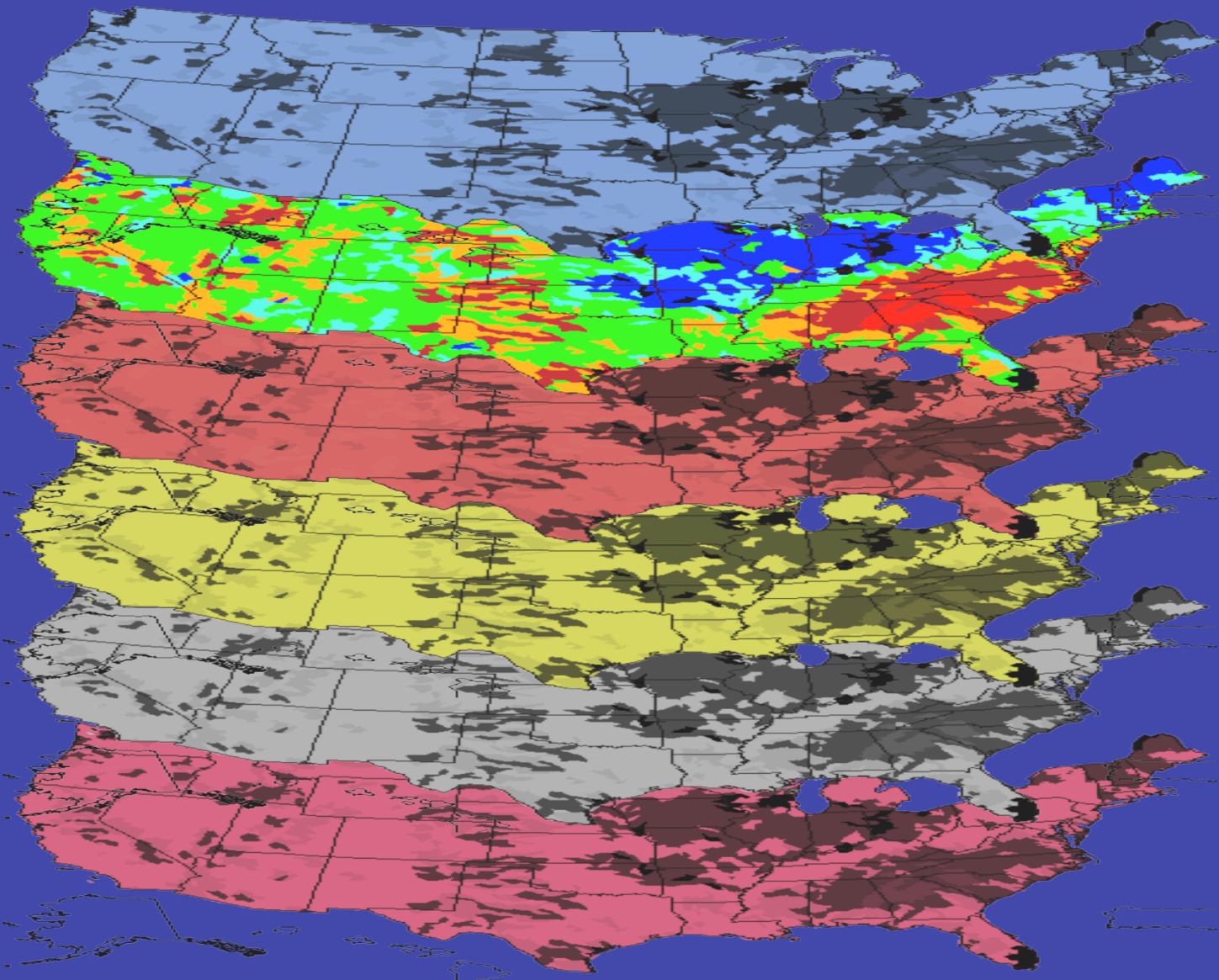
- GW/SW interactions
- Ecological Functions

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Runoff

Baseflow

ET

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Surface Storage

How will we apply the 2011 funds?

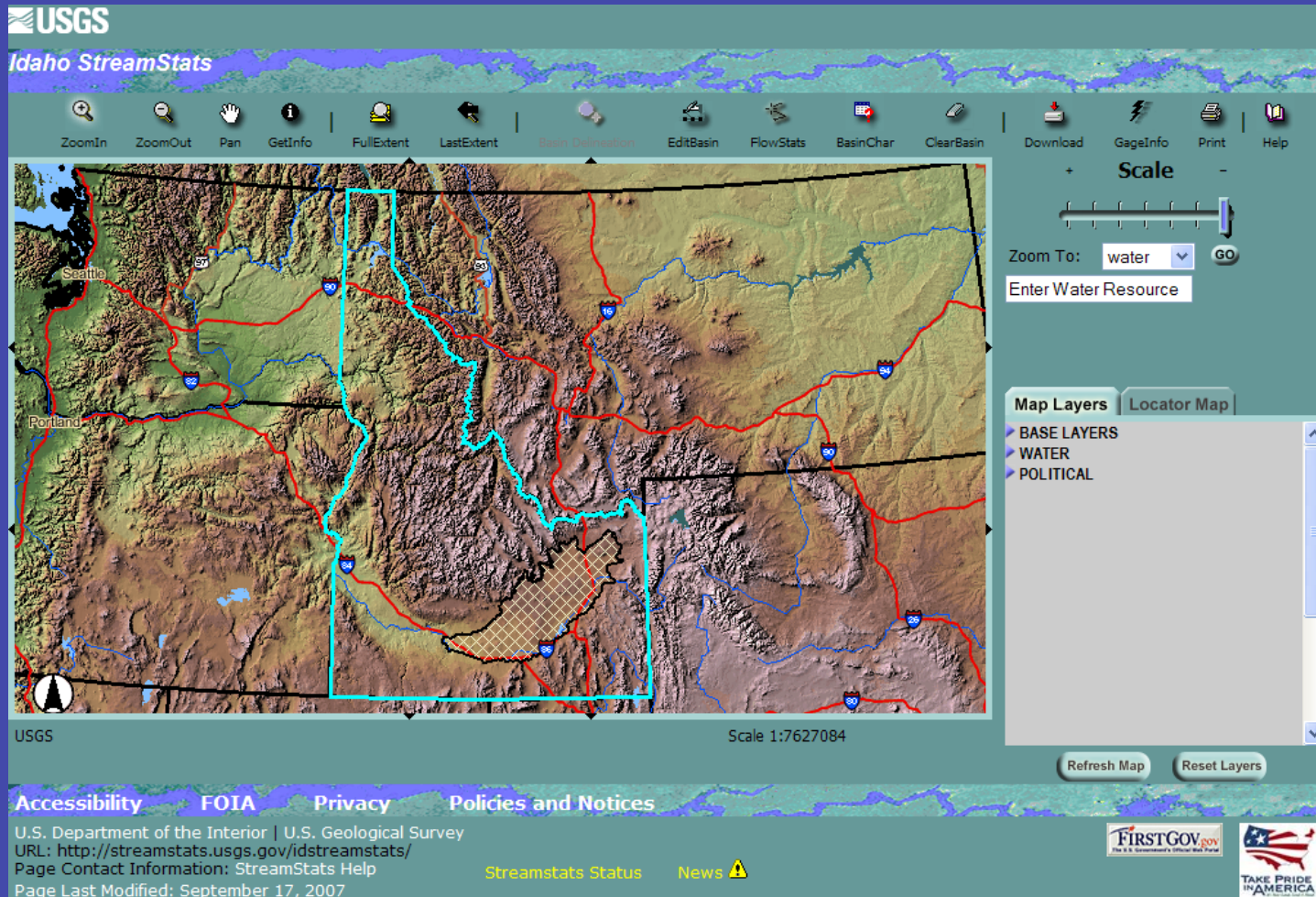
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Information Delivery and Databases:

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\$0.5 M

Total

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Next 3 slides – Presentation
of Ecological Flows
Concept Paper

Flows Needs for Wildlife and Habitat

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Biological Research and Monitoring \$0.5 M

Total \$1.35 M

Issues for Consideration

Implementation challenge: *The products from the Ecological Water Use component of the NWC will be needed by a broad and diverse set of participants in water allocation decisions.*

How far should USGS take the products for Ecological Water Use ?

National Classification of Streams into Hydroecological Types

Defining Flow – Ecological Response Relationships

Integration of Ecological Use with other components of the Water Census

Next 5 slides – Presentation
of Water Use Concept
Paper

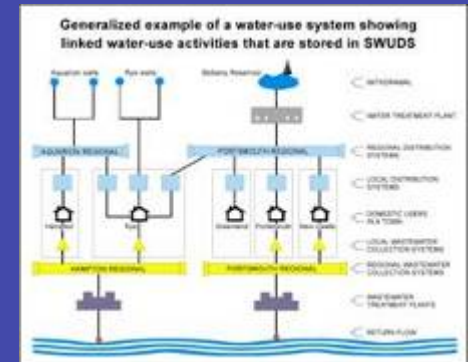
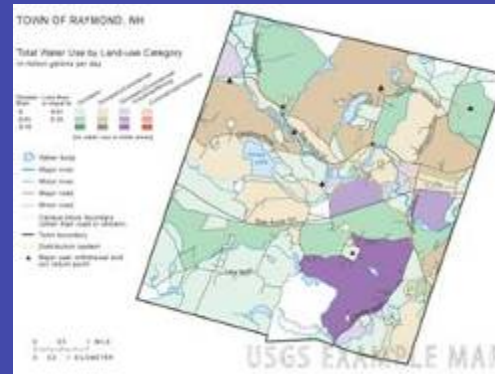
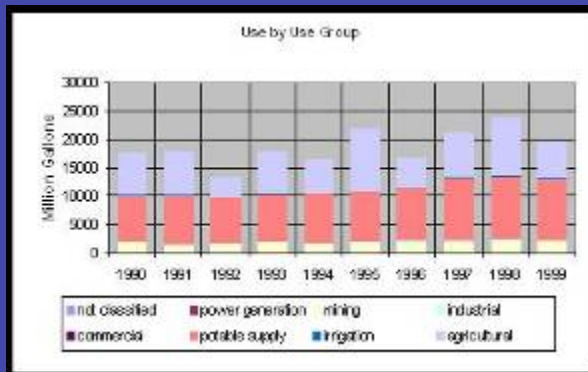
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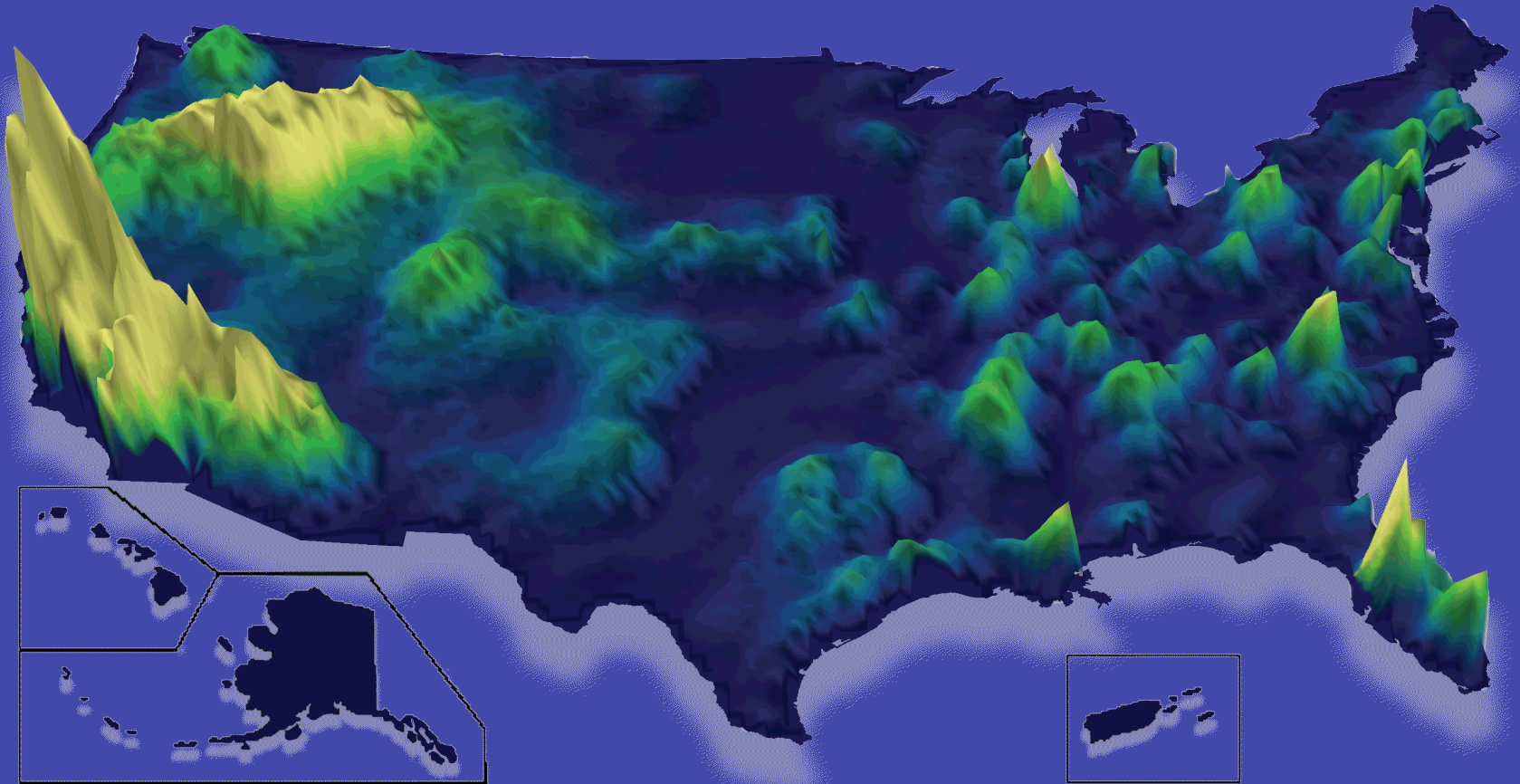
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Water Use Grants to States:

Hydrologic Networks and Analysis

\$1.0 M

Water Use Science Vision

We will significantly enhance our water use program by providing the capability to:

- We want to track human usage of water – source, transport, treatment, demand, consumption, collection, return flow.
- “Cradle to grave” water tracking for high-priority use categories.
- Analyze disparate databases to improve water use estimation.
- Develop regression models over a variety of landscapes
- Expand use of statistical sampling to verify, validate and improve water use models.
- Significantly expand our use of remote-sensing in water use science.

Water Use Science Vision

continued:

- Accurately estimate consumptive use on an annual and sub-annual basis for the full range of water use categories.
- Consumptive use profiles for all major industrial and commercial subsectors and for all 55,000 public community water supply systems.
- Map interbasin transfers of water down to the HUC 8 level.
- Re-institute sectors for hydroelectric and self-supplied commercial
- Quantify run-of-the-river flows for navigation and recreation
- Integrate water use information with streamflow and groundwater information.
- Use this enhanced capability to put out a more accurate and expanded Estimated Use of Water in the U.S. every two years.

Next 3 slides – Presentation
of Products, Decision
Support Systems, and
Information Management
Concept Paper

Information Management, Product Delivery, Decision Support Systems

Key Points:

- Inventory of key information/data sources
- Development of seamless national data layers
- Integration of water census data with NHD reach indexing
- Information security
- Water Census Data Delivery



*National GIS Interface
Meta data produced for data products
Web services delivery of data and
model results*

Issues for Consideration

Hydrologic/Ecologic Assessment Tools

- *Deterministic Models:*
- *Statistical Analysis Tools*
- *Repository to archive models*
- *Scenario development*

Periodic National Studies

Water Census would periodically issue joint national syntheses of its work with other programs.

- National Trends in Water Availability
- Water Quality Affects on Water Availability
- Ecological Flow Science in the United States
- Common Lessons Learned from Focus Area Studies
- Consumptive Water Use Science for the Nation
- National Water Use Compilations
- Energy and Water Use Analyses
- Comparisons of consumptive use and depletive uses by major basin.
- Expanded understanding of the affects of climate change on water availability